SPICE and desktop virtualization

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LinuxTag, May 11th

What is SPICE

- **S**imple **P**rotocol for **I**ndependent **C**omputing **E**nvironments

- Virtual **desktop** infrastructure

  - SPICE network protocol.

  - Virtual hardware (QXL).

  - Server and client implementations.

SPICE history

- Created by Qumranet.
  - Startup company which created KVM.
  - Acquired by Red Hat.
- freedesktop.org project since January 2010.
- SPICE support merged into qemu during 0.14 development cycle.

Server and desktop virtualization

- Server virtualization is commonplace these days, every hoster has offers.
  - Virtual machine.
    - CPU & memory.
    - Storage.
    - Network.
  - Administrator access.
    - Text mode (ssh, serial line).
    - Low end graphics (vnc).
- For desktop virtualization you need more ...

Wanted: better graphics

- Powerful graphics
  - ideally 3D which is good enough for desktop effects.
   - gnome shell
    - windows aero
- Multihead support.

SPICE: QXL graphics adapter

bar 0 ram	VGA framebuffer (8M)
	rendering commands, command data
	cmd rings, control fields (8k)

| bar 1
vram | surfaces:

offscreen pixmaps
(textures) |

| bar 2
rom | qxl device info (8k) |

| bar 3
io | initialization + reset |

- Virtual PCI Device.

- Two variants, with and without VGA compatibility, for multihead.

- 3D support not yet available.

SPICE: QXL rendering

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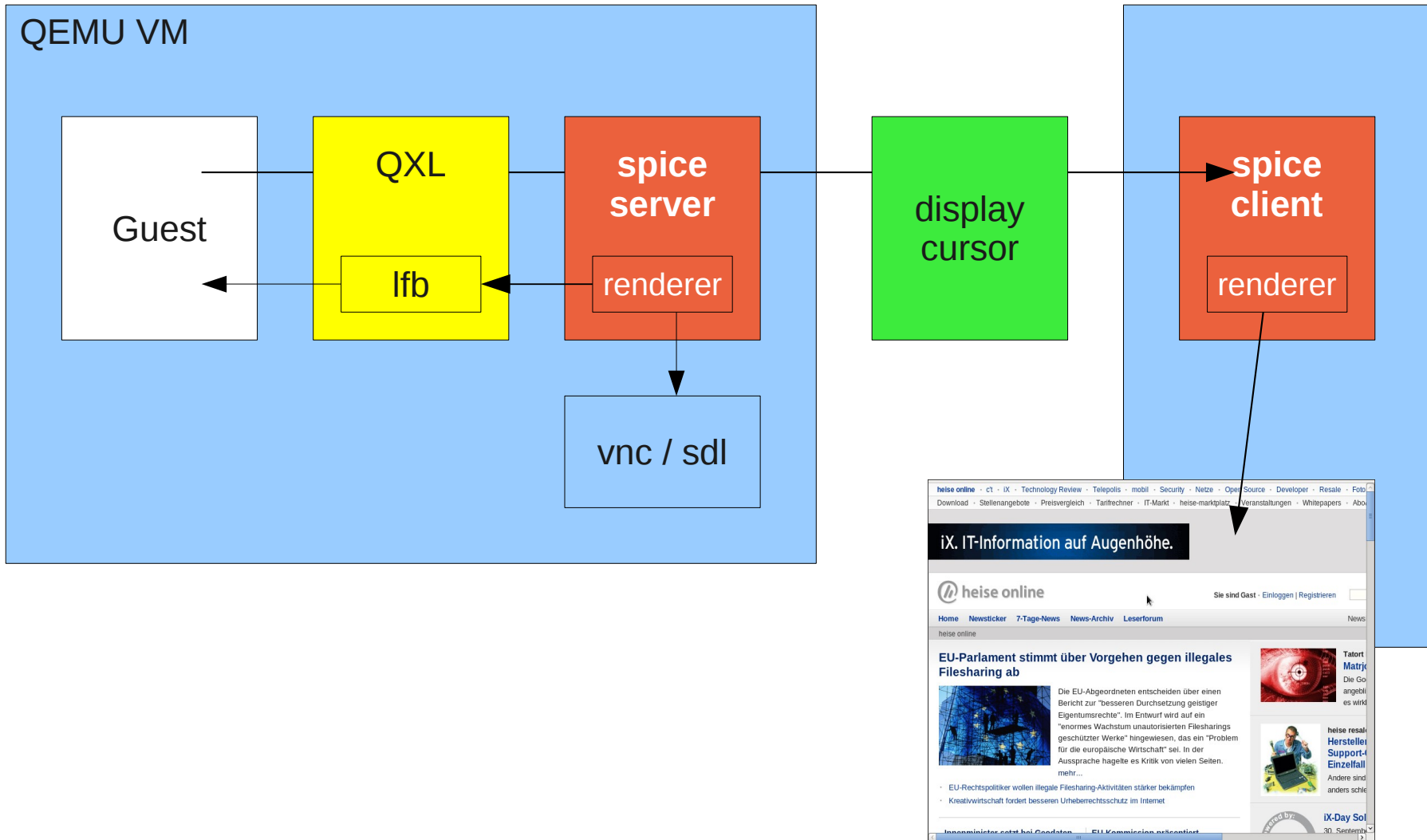
Wanted: multimedia

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SPICE: sound + video

- Sound forwarding.

- Video stream support.

  - Recognized by screen update patterns.

- Time stamps for synchronization.

QEMU: audio devices

- Intel HDA support (merged in 0.14).
    - Fix Win7 64bit sound issue.
- Experimental USB audio bits (not merged).

Wanted: Desktop Integration.

- Resize guest display.

- Cut+paste.

- Needs guest cooperation.

SPICE: vm channel & guest agent

- Channel between guest and spice client.

  - Nowdays a virtio-serial port.

  - Used to be a PCI device.

- Provides additional features when the agent is installed and active in the guest.

  - Guest Display configuration (including multihead).

  - Cut+paste support.

  - Absolute mouse events without USB tablet.

Wanted: USB support

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SPICE: USB forwarding

- Remote USB protocol (currently in development).
- Will also be usable without SPICE.

QEMU: USB needs some love

- Add physical port handling (started in 0.14).

- savevm / migration support (started in 0.14).

- Remote wake-up support (merged in 0.14).

  - Fix CPU burning.

  - Needs guest help.

- Get ready for USB 2.0 and 3.0 (started in 0.14).

  - Fix, improve and cleanup the USB subsystem.

  - Finally merge EHCI support.

- Improve isochronous xfers support (started in master).

Wanted: printing

- Print to the printer next to you, not the one in the server room or data center.
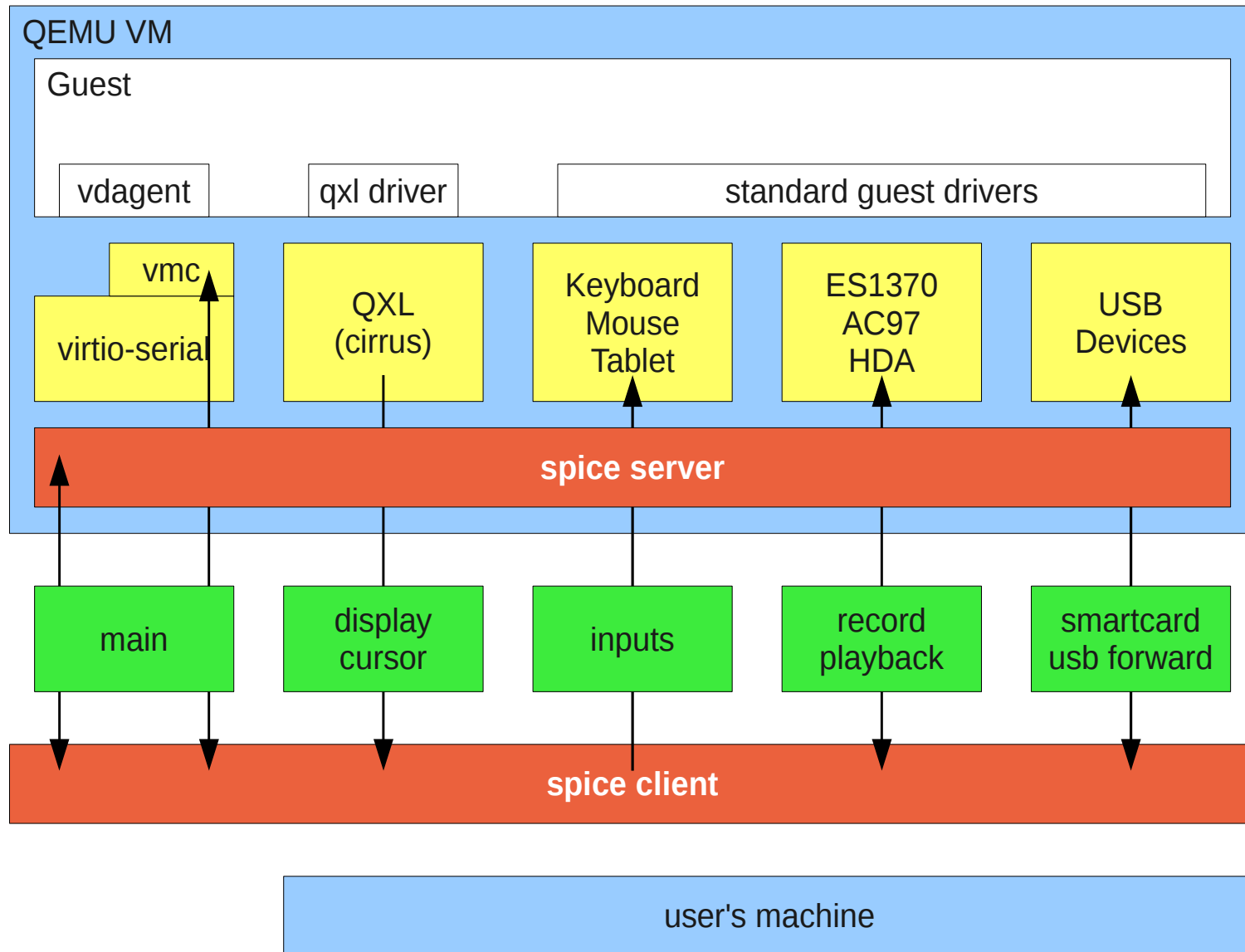
SPICE: network tunneling

- Allow guests to access network ressources (i.e. printers) in the client network.

- Experimental, off by default.

  - Configuration & Security issues.

- Need to check out other options.

  - USB Printer?

  - Cloud printing?

Big picture: Network protocol & Guest devices

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Integrate SPICE

- New spice-gtk client project.

  - libraries with glib objects and gtk widgets.

  - gtk-based client application "spicy".

- virt-manager supports spice (0.8.7+).

- vinagre supports spice (3.0).

Getting started

- Easy way: Fedora 15 & virt-manager.

- Starting qemu + client manually:

    - qemu command line:
      ```
      qemu -vga qxl -usbdevice tablet \
          -spice port=1234,disable-ticketing
      ```

    - classic spice client command line:
      ```
      spicec -h localhost -p 1234
      ```

    - spicy: Just start it, comes up with a dialog.
      Command line options work too.

Enable TLS, server side

- `qemu -readconfig spice.cfg`

```
[spice]
  port              = "5920"
#  disable-ticketing = "on"
  password          = "secret"

  tls-port          = "5921"
  x509-cacert-file  = "/home/kraxel/mini-ca/data/ca.crt"
  x509-cert-file    = "/home/kraxel/mini-ca/rincewind.crt"
  x509-key-file     = "/home/kraxel/mini-ca/rincewind.key"
  tls-channel       = "main"
  tls-channel       = "inputs"
  plaintext-channel = "display"
```

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Enable TLS, client side

- ```
  spicy -h rincewind.home.kraxel.org   \
     -p 5920 -s 5921 -w secret        \
     --ca-file /home/kraxel/mini-ca/data/ca.crt
  ```

- CA certificate can also be copyed / symlinked to
  `$HOME/.spicec/spice_truststore.pem`

Enable agent, qemu config

- `qemu -readconfig vmchannel.cfg`

```
[chardev "vmchannel"]
  backend = "spicevmc"
  name    = "vdagent"

[device]
  driver  = "virtio-serial"

[device]
  driver  = "virtserialport"
  name    = "com.redhat.spice.0"
  chardev = "vmchannel"
```

Enable agent, guest setup

- Windows

  - Fetch vdagent.zip from spice-space.org, unpack somewhere.

  - Run `vdservice install`

- Fedora 14+15, RHEL 6.1

  - `yum install spice-vdagent`

- Other Linux guests:

  - Get the bits from http://cgit.freedesktop.org/spice/linux/vd_agent/

Ressources

- http://www.kraxel.org/slides/2011-linuxtag-spice.pdf

- www.spice-space.org

  - Wiki, docs, downloads.

- spice-devel@lists.freedesktop.org

- cgit.freedesktop.org

  - Most git repositories are in the spice section.

  - The X11 qxl driver is in the x.org drivers section.

- http://gitorious.org/spice-gtk